

Just the Facts About ... Home Composting

Lawn & Landscaping Information Series

Getting Started

The key to successful composting is getting started simply and properly, avoiding unwanted surprises, and learning how to slowly adjust your composting technique to achieve a rich, beautiful product to serve the needs of your garden – and your lifestyle.

Location

Before starting, determine an appropriate location for the compost pile. Vegetable gardeners should set up piles or bins in the vegetable garden itself, thereby allowing any nutrients leaching out of the pile to enrich the garden's soil and feed surrounding plants.

All gardeners should select a level, easily accessible site, preferably near a water source and at least one foot away from any wooden structures (fungi do not discriminate between twigs, branches and fences). Bins or piles should not be built directly against a tree trunk or in a tree well, which might harbor bark-gnawing mice or inhibit respiration. To ensure domestic tranquility, avoid placing a pile directly on a property line or next to a neighbor's patio or window. A pile can be built in either sun or shade with equal success, although gardeners in hot, dry climates often favor a shaded location to prevent the pile from drying out during summer months.

To Bin or Not to Bin

Using a bin is often an aesthetic choice, although bins can play a practical role in effective composting. Freestanding piles can work

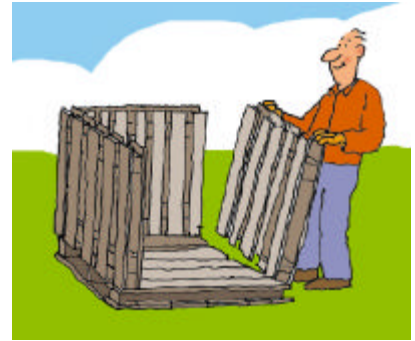
extremely well in most situations, although smaller piles are inefficient at conserving moisture and heat, which can be important elements in the compost ecosystem; moreover, mounded piles tend to shed water like a thatched roof.

Bins of almost any description can help organize materials, keeping a garden area tidy, and will also allow more control over the composting process. By simply concentrating materials together in a smaller volume, bins encourage a higher level of biological activity, which facilitates decomposition. Also, the materials lining the inside of the bin serve as a mulch layer, retaining moisture and the useful metabolic heat given off by the bacteria.

Design Considerations

Be sure to tailor your bin or bin system to accommodate the amount of material your property and garden generate. Also, avoid allowing the materials in any pile or bin to exceed five feet in height; besides being awkward to manage, tall piles will severely compact materials, reducing or cutting off the circulation of oxygen and potentially leading to sluggish, anaerobic conditions.

Covering a bin is only advisable for wetter climates, where an excess of precipitation might waterlog a pile or leach away an appreciable amount of valuable nutrients. Most temperate climate bins benefit from being open to the elements, where periodic rainfall can provide most of the moisture needed by a pile, especially if the top of the pile is given a concave or funnel shape to capture rainfall and other moisture. An exception should be made for cold, winter months when biological activity slows down and where additional moisture is not needed and may only leach away nutrients.



A Good Base

Before adding the first handful of compostable material, it is essential to establish a good base for the pile or bin. A six to ten inch layer of brush is usually sufficient and easily assembled by layering a variety of twigs, branches, corn stalks, and other coarse material on the ground to form a crude mat. These materials can also be broken up to fit inside a compost bin, if necessary. Another option is to use a wooden shipping pallet with half-inch spaces between slats as the base; pallets are plentiful and free, easily keep materials off the ground, and provide a smooth, flat working surface for pitchforks and other implements, and most commercial bins will sit right on top.

A compost base provides important drainage for the pile, since materials left directly on the ground can become saturated with water, leading to an anaerobic state. Earth-hugging piles can also become infiltrated by tree roots if left in place too long, making harvesting the compost incredibly difficult -- and potentially dangerous to the root system of the invading tree.

Raising the pile off the ground is also the first, best step toward achieving a self- (or passively-) aerated pile, meaning that less turning and maintenance is required. The base allows an ample supply of oxygen to enter the pile *from the bottom*, one of the lesser known secrets of effective composting. Since the microorganisms in the pile generate heat and carbon dioxide as metabolic byproducts, the warm gas will rise and vent from the pile, creating an upward draft which will then draw fresh air into the pile naturally -- but only if the pile is sitting above the ground, with the porous base providing oxygen to this biological furnace.



Compostable Materials

Homes and gardens across the country produce a wide variety of organic materials in very different proportions, with yard trimmings (leaves, grass, weeds, brush, and prunings) representing the major share of compostables, although kitchen scraps and agricultural manures can also play a significant role. And while almost anything organic will decompose, it does not mean that everything should simply be tossed into a compost bin and forgotten.

Leaves. Leaves are generally the easiest materials to manage and are frequently the carbon-rich backbone of most piles in temperate areas. All leaves can be composted, from *Abelia* to *Zelkova*, and all the ash, maples, and oaks in-between; there is no reason to be concerned about acidity or relative carbon-to-nitrogen values.

Leaves can be composted whole, or shredded and gathered up with a lawn mower and bagging attachment, or chopped up with a dedicated power shredder. As is the case with all compostable materials, reducing particle size will accelerate the decomposition process. Leaves added to a pile or bin should be moistened *as they are added*. Place a few armfuls into the bin and use a hose with spray attachment to thoroughly moisten them; repeat the process,

adding water at each step.

Leaves can be composted all by themselves, producing a high humus leaf-mold in about one year, if the pile is turned several times per season. Or the process can be hastened by incorporating other nitrogen-rich materials, like grass clippings and weeds, into the mix, producing a finer, loam-like compost.

Grass. Grass clippings are the second most widely composted yard material, full of nitrogen, and capable of speeding up the decomposition of carbonaceous materials such as leaves, straw, or

chipped brush. Most savvy gardeners realize that healthy lawns thrive when clippings are grasscycled, or left on the lawn after mowing. However, on some occasions, it is beneficial to remove clippings and add them to the compost pile.

For effective composting, grass should never be composted by itself. In fact, most odor complaints regarding compost piles result from piles made up of clippings alone. Grass is over 90 percent water and the thin blades rapidly clump together and form anaerobic masses giving off a strong ammonia odor. Always thoroughly mix grass into other dry or higher-carbon materials. Do not allow the grass to form layers, and do not simply dump loads of grass onto an existing pile. Grass must always be worked into a pile.

Weeds. Even the best gardeners have to pull weeds, but it is the wise composting gardener that turns weeds into a success story. Weeds are like grass, succulent and full of nitrogen, and should be cheerfully mixed into the pile, with the important exception of invasive weeds, weeds with vigorous rhizomes, or weeds which have already set seed, all of which should be kept away from the pile.

Woody materials. Hedge trimmings, small twigs and branches, stalks, wood mulch (both old and new), pine cones, large seed pods, and other woody matter and brush are extremely high in carbon and will take longer to decompose than leaves. Decomposition can be aided by chipping the materials, or by at least cutting them up with lopping shears or hand pruners. A

good rule of thumb is never to add anything longer than six inches in length or thicker than half an inch. Larger materials will simply haunt the compost pile for years to come and make turning the pile more difficult.

Other trimmings. Ornamental grasses, decorative vines, dead-headed flowers, annuals, perennial prunings, and most of the other herbaceous material in the garden can and should be added to the pile, again being careful to chop up materials as much as possible. Pine needles can be also be added, although they are somewhat slow to break down and are always ready to be used immediately as a mulch wherever acid-loving plants are concerned.

Agricultural Manures. Animal manures are wonderful sources of nitrogen and other nutrients, especially for gardeners without access to grass clippings. Poultry manure is a concentrated source of nitrogen, although the odor is rather difficult to work around. Cow manure is one of the most valuable additions to the compost pile and the garden, while horse manure is readily available, even in most urban areas. Exercise caution when using agricultural manures, however, especially with stable "sweepings," since those materials often harbor a high percentage of viable weed seeds. Strive to attain a hot pile to destroy remaining seeds.

Food Scraps. Spoiled vegetables and fruits and kitchen scraps provide a rich, free source of nitrogen. Coffee grounds are as high in nitrogen as grass clippings, and can even be brought home by the bucket from gourmet coffee shops. Tea leaves and tea bags, coffee filters, corn husks and cobs, fruit rinds, vegetable trimmings, egg shells, and a miscellany of peels and scrapings -- anything other than meat or dairy-related materials or shortenings -- are prime candidates for addition, although they must be added properly.

Any food item, including spoiled fruits taken directly from the garden, should always be buried at least one foot into an existing pile. Depositing scraps on top of the pile, even an enclosed bin, is a guaranteed method

for attracting fruit flies, gnats, maggots, and larger "winged" and "tailed" pests. In urban areas or communities with rodent problems, a completely enclosed unit, such as a lidded metal trash can with small holes, is recommended, as are indoor worm boxes.

Household materials. Compostable materials from around the house are usually carbon-rich, including black and white newspaper sections, corrugated and uncoated cardboard, dried flowers, wood or fireplace ash (never charcoal or coal ash), and untreated sawdust. Cardboard and newspaper should be ripped-up into strips and moistened, preferably by soaking in a bucket of water.

Materials to Avoid

Good hygiene is as important for the compost pile as it is for the garden. It is always best to avoid adding any diseased plant materials since viruses and other pathogens, including nematodes and related pests, are not always destroyed in the composting process. Observe the adage, when in doubt, throw it out. Also, despite industry assurances, it is advisable to avoid adding pesticide-treated plants, including grass clippings, especially if the finished compost is to be used in a vegetable garden; a similar warning should be noted for pressure-treated wood scraps and sawdust. Do not add irritating plant materials such as poison sumac and poison ivy, although nettles will break down completely. Avoid adding any food materials which have been mixed with shortenings, spreads, meats, or dairy products. Add grain-derived foods with caution. Never add bones, fat, or meat itself. And never add the fecal waste of dogs, cats, or other carnivorous pets to avoid disease pathogens both while in handling and using the compost.

Also, while not dangerous, some items might best be left out of the pile, including the waxy leaves of magnolias and hollies, which break down very slowly, pine cones, and sweet gum "balls," among other stubborn materials, although chipping will speed them on their way.

The Right Stuff

The types of materials added to a well-made pile, and their management, will determine the quality of the final compost product. Leaves alone, properly moistened and turned, fluffed, or aerated several times per season will result in a satisfactory and workable leaf-mold -- but not a finished compost. For best results, a compost pile must be, as the word implies, a composite of different materials.

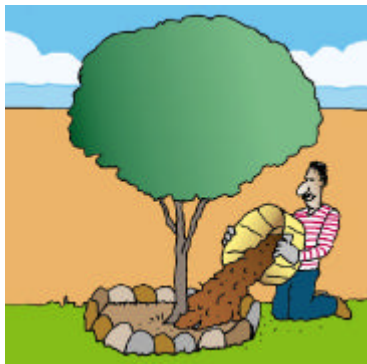
Most composting literature revolves around the legendary and ideal carbon-to-nitrogen (C:N) ratio of 30:1, borrowing from the fact that all organic matter contains a certain percentage of both carbon and nitrogen. In effect, the varied strains of bacteria primarily responsible for decomposition have an ideal "diet" of 30:1, wherein the carbohydrates of carbon are balanced by a suitable proportion of protein or nitrogen. Most deciduous leaves have a C:N range of 50-70:1, while grass clippings, manures, and food scraps have a range of 15-20:1; woody materials often range as high as 500:1. Too much nitrogen in a pile results in the formation of ammonia gas, too much carbon and the pile will sulk for years. Mix the ingredients together, and a balance is achieved, resulting in a C:N more ideal for the bacteria, and in a faster, harder working compost pile.

Getting to the ideal mix of materials is generally a process of experimentation: mixing different types of material when they become seasonably available. In autumn and winter, leaves should be gathered and prepared in the bin; in spring and summer, grass and other green plant matter should be collected and mixed into the pile. As the materials are blended, the temperature of the pile will rise, signifying a dramatic increase in biological activity.

During peak mixing season, it will be necessary to turn or aerate the pile every time new materials are added and, for a hot pile, approximately once every two weeks. Turning with less frequency will also result in a good compost product, but will necessarily take longer.

Investment

It is beneficial to the composting process to invest time and energy in initially building the bin or pile, ensuring that added materials are moist, selecting the proper diversity of materials for a compost "stew," and periodically checking and correcting the moisture content. Beyond establishing a healthy pile, a composter can spend as much or as little time in maintenance as is desired. Frequent turning, and shredding materials, will boost the process, but a slower approach can also yield an elixir for the garden.



Many composters actually prefer to exert themselves less and let time and nature -- and earthworms -- do most of the work. This more passive approach is well served by using two compost bins or systems, one for each alternating year. Fill a bin this year, harvest from it in two years, and so on, back and forth, with a fraction of the turning, mixing, and management. The final compost from this "vintage" approach may be lighter in nutrient content, but still valuable as an organic soil conditioner.

Troubleshooting

Sometimes things go wrong -- even with composting. Fortunately, every problem has a fairly direct solution, with most of the problems stemming from lack of moisture, too much moisture, a nitrogen imbalance, or poorly managed food scraps. See the Troubleshooting Chart on the following page for more information.

Troubleshooting: Common Problems, Causes, and Solutions		
Bad Odor	Uncovered or improperly used food scraps	Remove and discard any improper materials (meats, dairy, etc.); bury materials under one foot or more of inert materials.
Bad Odor	Anaerobic pile	Turn materials, mixing in dry leaves, straw, or wood chips. Check base of pile for proper drainage.
Bad Odor	Too much grass	Mix grass with other dry or high-carbon materials or remove some grass, spread out to dry, and mix back into pile.
Insect Pests	Too dry, not mixed properly	Make sure food materials are properly buried, and turn outer layer of materials into core of pile. Hot piles will destroy or deter most insects, such as grubs and other larvae (maggots). Moisten pile if necessary; moist piles deter bees and wasps. Use caution when taking wood chips and woody material from potential termite and carpenter ant sources such as rotted wood piles or municipal mulch piles.
Insect Pests	Not necessarily pests	Not all insects in a compost pile are "pests," the compost ecosystem includes a host of useful invertebrates, including isopods, millipedes, centipedes, worms, ants, among others.
Animal Pests	Improper food handling	Most animals are deterred by burying food under other materials; for persistent problems, especially with rodents, stop adding food, use an enclosed bin, or change bin design to restrict access. A secure lid will discourage most possums, raccoons, and birds.
Pile not breaking down	Insufficient nitrogen	Add grass, manure, kitchen scraps or other natural nitrogen source.
Pile not breaking down	Pile is too dry	Add water while turning until moist, not wet; should feel like a sponge throughout.
Pile not breaking down	Poor aeration	Start turning and mixing materials more often; check integrity of base, replace if broken down.
Pile heats up, then stops	Poor aeration	Hot piles need lots of fresh oxygen: turn materials as pile starts to cool down. It might be necessary to add an additional nitrogen source periodically.
Pile is slightly warm at middle	Too small	Piles require a certain critical mass (approximately 18-20 cubic feet) to work efficiently. Add more materials if possible, or use a smaller bin to concentrate the pile's volume.

For more information:



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